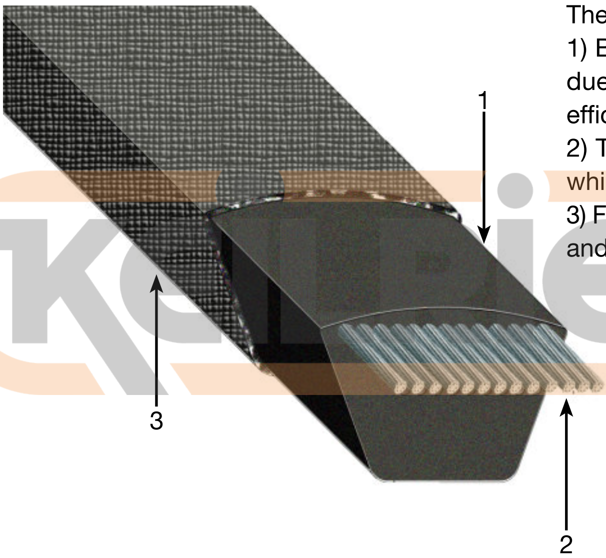
# V-BELTS

Rubber V-belts

MEGADYNE

Megadyne V-belts have been used for decades in the most different industries and applications, offering drive solutions to customers all over the world.
Applied technology guarantees such a dimensional precision in V-belts which allows them to be suitable for multiple transmissions. This dimensional stability continues also during belt use.

The variety of belt sizes available allows the application of Megadyne V-belt in a wide range of drive applications, such as:
machine tools
industrial washing machines
textile machines
continuous paper machines
high power mills
stone crushers




The main V-belt components are:
1) Belt body made of a special rubber compound which provides, due to its excellent mechanical characteristics, high transmission efficiency and assures a minimum rubber wear off;
2) Tensile member consisting in high-strength low-stretch cords, which grant length stability over the belt life time;
3) Fabric jacket or cover made of fabric, protecting the tensile member and permitting the use of back side idler.

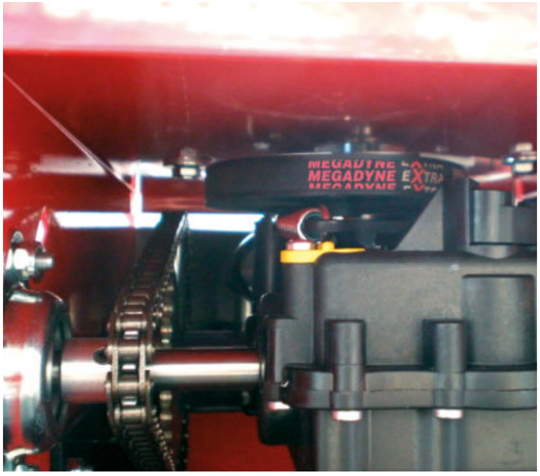


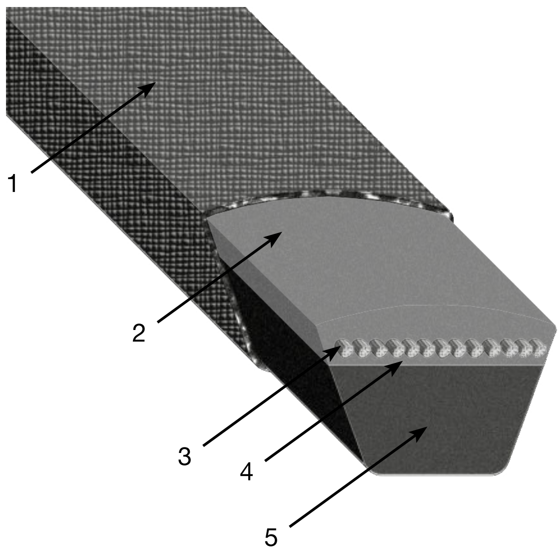
## MECHANICAL AND CHEMICAL FEATURES

- smooth starting and running
- wide range of driven speed
- low maintenance
- high efficiency
- extremely wide horsepower ranges
- dampen vibration between driver and driven pulleys
- silent operations
- long life service
- easy installation
- reduction in drive dimension
- working temperature range from -30°C to +80/90°C (see details in family pages)
- oil and heat resistance
- antistatic properties

**MEGAMATCH** MEGA MATCH
All V-belts carrying the MEGA MATCH logo are made and supplied according to the matching set tolerances and limits indicated by the relevant international standards (ISO,RMA, etc)

# INTRODUCTION TO V-BELTS




## WRAPPED BELTS

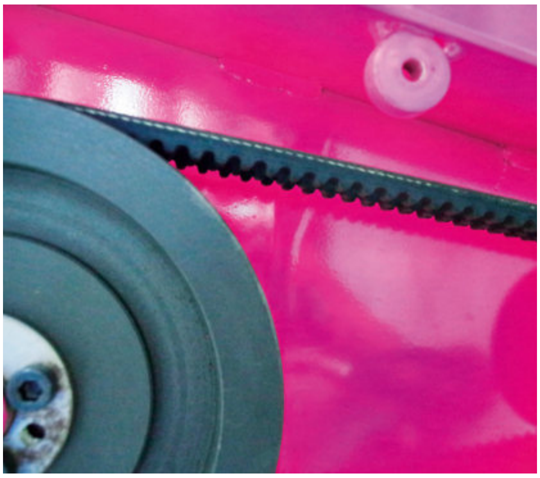
### EXTRA
Extra belts were designed to offer durable and reliable performances on light and medium-duty drives. They represent an affordable solution for transmission systems of all industrial sectors.

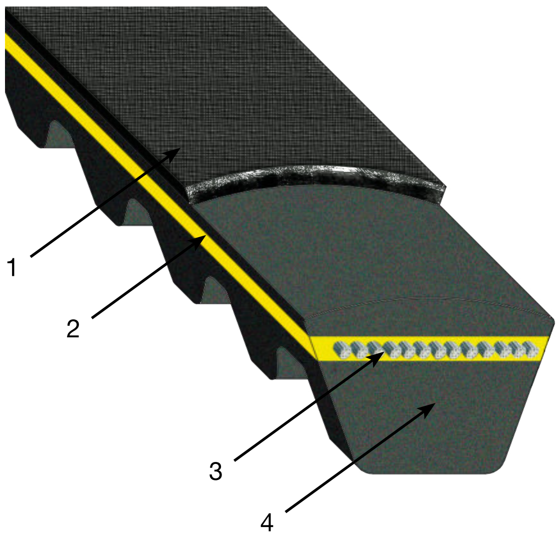
### OLEOSTATIC
Oleostatic rubber belts are developed with high resistant tensile elements, they are characterised by high performances, length stability during belts life, conductivity, oil and heat resistance. They are particularly suitable for centrifugal pumps, compressor, tool machines, generators, high power mills and stone mills.

### OLEOSTATIC GOLD
Different materials and design features, together with an improved production process, have led to the development of a new class of higher rated wrapped V-belts. The new OLEOSTATIC GOLD V-belts products family can operate in a wide range of industrial applications, within a large spread of load capacities and speeds — offering rated performance from 100 to 8,000 RPM and power capability from 1 to 400 kW, meanwhile granting large cost advantages for the end users.

**Oleostatic Gold structure:**

1) FABRIC: Double cover ply - CR Dip.
   A reinforced, double fabric cover is plied around the belt to protect it against contamination and moisture. Its increased flexibility allows the belt to bend more easily around the smallest pulleys with far less strain on the fabric, while assuring a smoother running drive.
2) TOP CUSHION: SBR compound + Fibers
3) TENSILE CORD: H.T. Polyester
   The tensile section is made up of a multiple number of high-strength, low elongation polyester cords, completely embedded in the adhesion layers, to enhance resistance to tension and flex-fatigue. Each cord is individually and specially coated to secure a long-lasting bond with the surrounding rubber and to grant a longer operational lifetime. In addition the belt requires significantly less retensioning and take-up due to its cord's consistent length stability. Longer belt life means less frequent replacement, less downtime and lower maintenance costs.
4) BOTTOM CUSHION: SBR compound + Fibers
5) BODY COMPOUND: Polycloroprene (CR) based






**RAW EDGE**

**LINEA-X**

These belts have been specifically developed to run where small pulleys diameters and high transmission ratios put a limit to the use of wrapped belts of the same section.

Compared to wrapped belts, the LINEA-X family offers important improvements, like specific compounds and special production technology. In particular the transverse orientation of the fibers improves the cord support capacity of the body section and reinforces its transverse rigidity, while maintaining, (due to the cogged profile and the precision-ground sidewalls) the highest longitudinal flexibility and running stability. These characteristics guarantee an excellent structure with advantages such as: high transmission ratios, improved grip and resistance to continuous bending.

**LINEA GOLD**

The NEW generation of raw edge belts
New materials, advanced design features and an innovative production process has led MEGADYNE to develop a new generation of raw edge V-belt drives that outperform, in a wide range of industrial applications, all the previous drives equipped with standard raw edge belts, granting large cost advantages for the end users and greater design flexibility for the engineers. The belt has a narrow cross section and a raw edge construction, based on a new EPDM rubber compound which can outstand chemically aggressive environments, ageing, ozone, UV and heat.

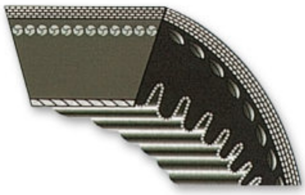


Linea Gold structure:
1) BACKSIDE FABRIC
A textile fabric is plied on the belt backside to protect it against contamination and moisture.
Its flexibility gives the belt excellent reversed bending properties when backside idlers are used and protects the belt against wear.
2) ADHESION LAYERS
An innovative, colored, EPDM compound located immediately above and below the belt cords, guarantees the best possible bonding with the under cord body material.
3) TENSILE CORD
The tensile section is made up of a multiple number of high-strength, low elongation polyester tensile cords which are completely embedded in the adhesion layers and vulcanized as one solid unit to enhance resistance to tensile and flex-fatigue forces. On request, for special extreme requirements, aramid or glassfibre cords are also available.
4) BODY COMPOUND
A newly developed EPDM compound, with high-performance fibers embodied in the rubber matrix, provides to the belt with superior abrasion and wear resistance. The transversal orientation of the fibers improves the cord support capacity of the body section and reinforces its transversal rigidity, while maintaining, in connection with the cogged profile and the precision-ground sidewalls, the utmost longitudinal flexibility and running stability.

| SECTIONS | |
|---|---|
| Z | E |
| A | 20 |
| B | 25 |
| C | 45 |
| D | 50 |

**Classical wrapped V-belts**

(Extra - Oleostatic - Oleostatic Gold)



| SECTIONS |
|---|
| AX |
| BX |
| CX |

**Classical raw edge V-belts**

(Linea Gold)

| SECTIONS |
|---|
| SPZ |
| SPA |
| SPB |
| SPC |

**Narrow wrapped V-belts DIN**

(Extra - Oleostatic Gold)

| SECTIONS |
|---|
| XPZ |
| XPA |
| XPB |
| XPC |

**Narrow raw edge V-belts DIN**

(Linea-X - Linea Gold)

| SECTIONS |
|---|
| 3V |
| 5V |
| 8V |

**Narrow wrapped V-belts RMA**

(Oleostatic)



| SECTIONS | |
|---|---|
| 13x6 | 36x12 |
| 17x6 | 37x10 |
| 21x7 | 42x13 |
| 22x8 | 47x13 |
| 26x8 | 52x16 |
| 28x8 | 55x16 |
| 30x10 | 65x20 |
| 32x10 | 70x20 |

**Variable speed V-belts**

(Varisect)

| SECTIONS |
|---|
| XDV2-38 |
| XDV2-48 |
| XDV2-58 |

**Xtra Duty V-belts**

(XDV2)

| SECTIONS |
|---|
| AA |
| BB |
| CC |

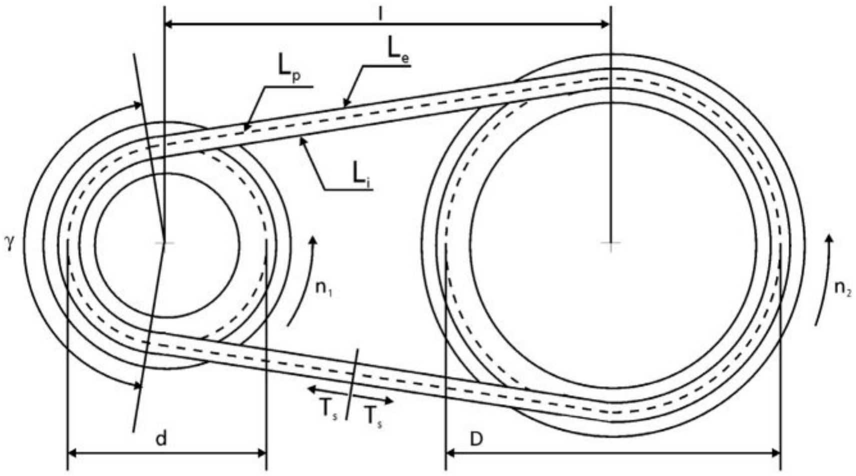
**Double V-belts**

(Esaflex)

| SECTIONS | |
|---|---|
| RA | RSPC |
| RB | R3V |
| RC | R5V |
| RSPZ | R8V |
| RSPA | R3VX |
| RSPB | R5VX |

**Banded V-belts**

(Pluriband)




| Symbol | Unit | Definition | Symbol | Unit | Definition |
|---|---|---|---|---|---|
| $C_\gamma$ | | correction factor $C_\gamma$ | $L_p$ | mm | pitch length (effective) |
| $C_L$ | | correction factor $C_L$ | $n_1$ | RPM | speed of smaller pulley (faster) |
| $C_c$ | | correction factor $C_c$ | $n_2$ | RPM | speed of bigger pulley (slower) |
| d | mm | pitch diameter of smaller pulley | P | kW | power to be transmitted |
| D | mm | pitch diameter of bigger pulley | $P_a$ | kW | actual power of the transmission |
| l | mm | theoretical center distance | $P_b$ | kW | basic performance of a single belt |
| $l_e$ | mm | effective center distance | $P_c$ | kW | corrected power |
| i | | transmission ratio | $P_d$ | kW | difference to Pb due to K≠1 |
| L' | mm | calculated pitch length | Q | | number of belts |
| $L_e$ | mm | external length ($L_p$+$\Delta_e$) | $T_s$ | N | static belt tension |
| $L_i$ | mm | internal length ($L_p$-$\Delta_i$) | v | m/s | peripheral belt speed |
| | | | γ | ° | arc of contact |



## BELT SECTION

Necessary data for selection of the belt section:
P = power to be transmitted in kW
$n_1$ = speed in RPM of the smaller pulley
$n_2$ = speed in RPM of the bigger pulley
It is necessary to correct the power P by a coefficient $C_c$ (see table 1 page 6) which considers into account the actual operating conditions.

Corrected power $P_c$ is given by:
$P_c = P \cdot C_c$
The graphs gives a guiding criterion for the section of the belt.

## TRANSMISSION RATIO

Transmission ratio is calculated as follows:

$$i = \frac{n_1}{n_2} = \frac{D}{d}$$

where D is the pitch diameter of larger pulley and d is the pitch diameter of the smaller pulley.

# TECHNICAL CALCULATION

Peripheral speed of the belts is determined by

$$v = \frac{d \bullet n_1}{19100}$$

If the drive being calculated is of the V/flat type (one V pulley and one flat pulley) it is necessary to find the corresponding pitch diameter of the flat pulley.
The pitch diameter of the flat faced pulley is obtained by increasing its external diameter by the amount in millimetres shown in the following table:

| Z | A | B | C | D | E | 19 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|
| 8 | 10 | 14 | 20 | 24 | 33 | 16 | 15 | 19 |

## PITCH LENGTH OF THE BELT AND CORRECT CENTER DISTANCE

Whenever the shaft center distance l is not predetermined by the layout of the drive, the optimum distance may be chosen as follows:

$1<i<3 \qquad l \geq \frac{(i+1) \bullet d}{2} + d$

$i>3 \qquad l \geq D$

The pitch length is determined by:

$$L' \cong 2 \bullet l + 1{,}57 \bullet (D+d) + \frac{(D-d)^2}{4l}$$



From the list of belt sizes, should be selected the belt pitch lenght $L_p$ nearest to the value of L' above calculated.
Since $L' \neq L_p$ the center distance "**l**" may be varied by subtracting half $L' - L_p$. Therefore the effective center distance of the drive will be:

$$l_e = l - \frac{(L'-L_p)}{2}$$

## NUMBER OF BELTS

The basic performance $P_b$ is the power which a single belt transmits under the following conditions:

• i = 1

This configuration corresponds to 180° arc of contact belt on both pulleys;

• i ≠ 1

The difference of kW-rating $P_d$ is the power which the belt transmits in excess of $P_b$ because i ≠ 1 in service conditions.
The actual kW-rating $P_a$ is the power which the belt transmits in operating conditions and is obtained by means of:

$$P_a = (P_b + P_d) \times C_g \times C_L$$

Table 4 (see belt family pages) gives the values of $P_b$ according to RPM and d (smaller diameter) and the values of $P_d$ according to RPM and i.

Table 2 (bottom of this page) and 3 (see belt family pages) give values of the coefficients $C_\gamma$ and $C_L$ taking into account the operating conditions.

The arc of contact g of the belt on the smaller pulley is determined by:

$$\gamma = 180° - 57 \bullet \frac{D\text{-}d}{l_e}$$

The number of belts Q necessary for the transmission of the power $P_c$ is determined by:

$$Q = \frac{P_c}{P_a}$$

The number of belts actually is obtained in general by rounding up Q to the next highest whole number.

## TABLE 1 - TYPE OF MOTOR

**Drivers**

(1)
AC electric motors: high slip, squirrel cage, synchronous:
DC electric motors: parallel excitation;
multi-cylinder internal combustion engines;
gas or steam turbines.

(2)
AC electric motors: high torque, high slip, single phase, wound rotor, commutator;
DC electric motors: series and compound excitation;
single-cylinder internal combustion engines with direct coupling or with countershaft;
steam engines.



| Applications | Daily operating hours | | | | | |
|---|---|---|---|---|---|---|
| | 0-8[1] | 8-16[1] | 16-24[1] | 0-8[2] | 8-16[2] | 16-24[2]) |
| **Light use** Centrifugal pumps and compressors, belt conveyors, (light materials) fans and pumps up to 7,5 kW. | 1,1 | 1,1 | 1,2 | 1,1 | 1,2 | 1,3 |
| **Normal use** Shears for steel sheet presses, belt and chain conveyors, (heavy material) sifters, generator sets, machine tools, kneading machines, industrial washing machines, printing presses, fans and pumps over 7,5 kW. | 1,1 | 1,2 | 1,3 | 1,2 | 1,3 | 1,4 |
| **Heavy use** Hammer mills, piston compressors, belt conveyors for heavy loads, lifters, textile machines, continuous paper machines, piston and dredging pumps, ripping saws. | 1,2 | 1,3 | 1,4 | 1,4 | 1,5 | 1,6 |
| **Extra heavy use** High power mills, stone crushers, calendars, mixer, cranes, diggers, dredgers. | 1,3 | 1,4 | 1,5 | 1,5 | 1,6 | 1,8 |

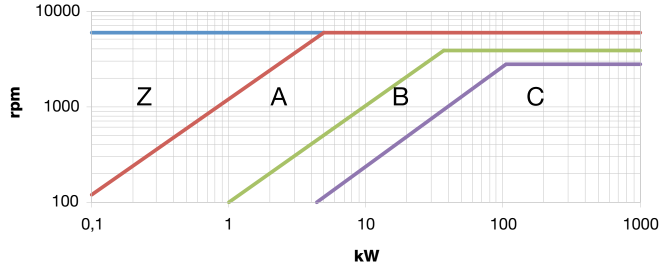
## TABLE 2 - Correction factor Cγ (T/T=V/V drives; T/P=V/Flat drives; γ=arc of contact on the smaller pulley)

| | γ | 180° | 175° | 170° | 165° | 160° | 155° | 150° | 145° | 140° | 135° | 130° | 125° | 120° | 115° | 110° | 105° | 100° | 90° |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $C_\gamma$ | T/T | 1 | 0,99 | 0,98 | 0,96 | 0,95 | 0,93 | 0,92 | 0,90 | 0,89 | 0,87 | 0,86 | 0,84 | 0,82 | 0,80 | 0,78 | 0,76 | 0,74 | 0,69 |
| | T/P | 0,75 | 0,76 | 0,77 | 0,79 | 0,80 | 0,81 | 0,82 | 0,83 | 0,84 | 0,85 | 0,86 | 0,84 | 0,82 | 0,80 | 0,78 | 0,76 | 0,74 | 0,69 |

# WRAPPED V-BELTS SELECTION CHARTS

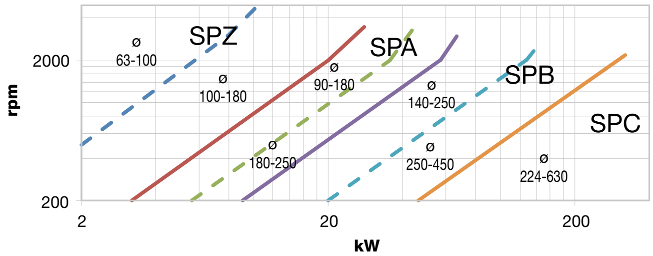
## Classical wrapped V-belts

### EXTRA

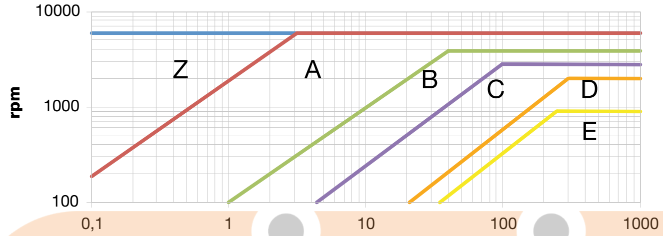



## Narrow wrapped V-belts DIN

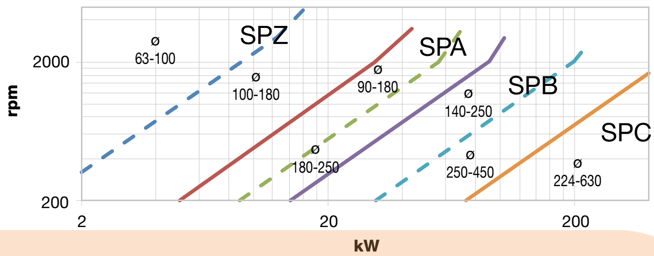
### EXTRA




### OLEOSTATIC GOLD



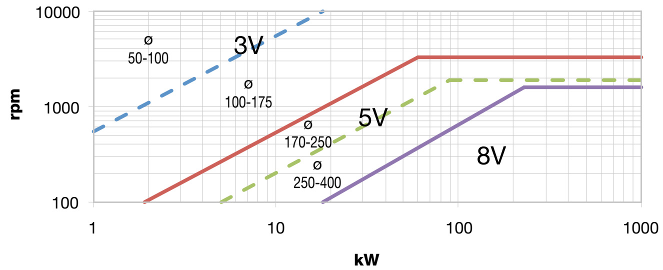

### OLEOSTATIC GOLD





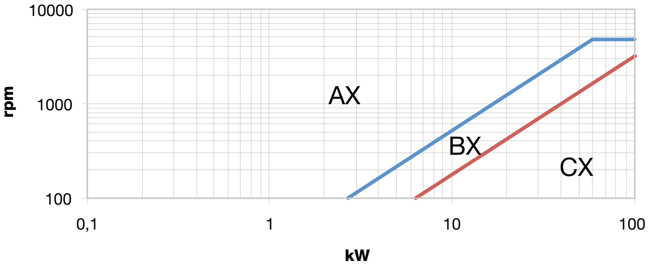

## Narrow wrapped V-belts RMA

### OLEOSTATIC



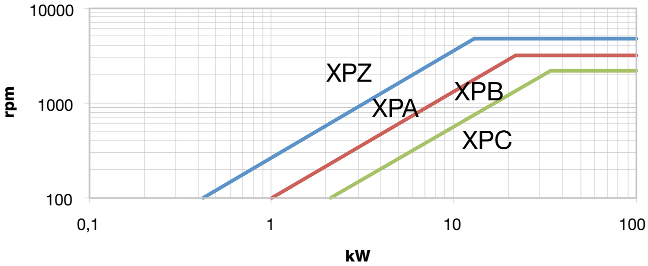
## Classical raw edge V-belts

### LINEA GOLD

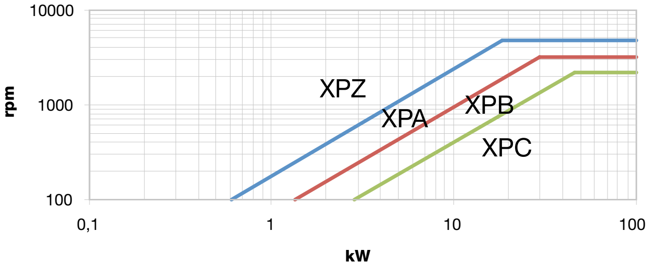



## Narrow raw edge V-belts DIN

### LINEA-X




### LINEA GOLD

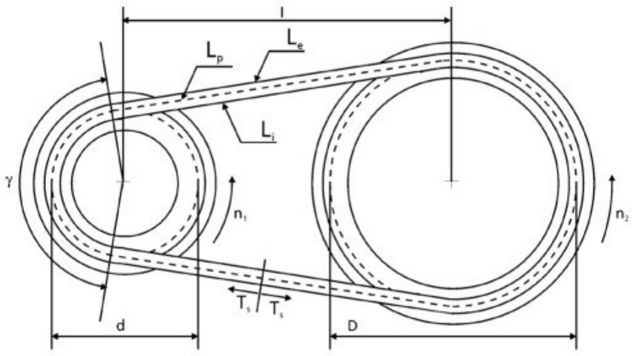


# CALCULATION EXAMPLE

**EXAMPLE**
P = 22 kW
$n_1$ = 1200 RPM
$n_2$ = 660 RPM
Textile machine operating 12 hours a day
Type of motor: ac electric motor, normal torque

The correction coefficient is 1,3 (see table 1)
The corrected power is:

$P_c = 22 \cdot 1{,}3 = 28{,}6$ kW




## BELT SELECTION

From selection charts, for $P_c$ = 28,6 and $n_1$ = 1200 RPM it is appropriate to choose section B.

## TRANSMISSION RATIO

The transmission ratio can be calculated as follows:

$$i = \frac{n_1}{n_2} = \frac{1200}{660} = 1{,}82$$

Considering diameter d = 250 mm for the smaller pulley, the pitch diameter of the larger pulley is:

$$D = i \cdot d = 1{,}82 \cdot 250 = 455 \text{ mm}$$

Peripheral speed of the belts is determined by

$$v = \frac{d \cdot n_1}{19100}; \quad v = \frac{0{,}052 \cdot 250 \cdot 1200}{19100} = 15{,}7 \text{ m/s}$$



## BELT PITCH LENGTH AND CORRECT CENTER DISTANCE

For i = 1,82 (i.e. 1<i<3) the center distance is given by:

$$I \geq \frac{(i+1) \cdot d}{4} + d \qquad \text{so} \qquad I = 610 \text{ mm}$$

The pitch length of the belt is determined by:

$$L' = 2 \cdot I + 1{,}57 \cdot (D+d) + \frac{(D-d)^2}{4 \cdot I};$$

$$L' = 2 \cdot 610 + 1{,}57 \cdot (455+250) + \frac{(455-250)^2}{4 \cdot 610} = 2344 \text{ mm}$$

From the list of belt sizes (see table on belt family pages), should be selected the belt pitch lenght $L_p$ nearest to the value of L' previously calculated.
The center distance "**I**" may be varied by subtracting half L'-$L_p$. Therefore the effective centre distance of the drive will be:

$$Ie = I - \frac{L'-L_p}{2}$$

Having selected **Oleostatic Gold B 91** ($L_p$ = 2355 mm), the actual shaft center distance is calculated by:

$$Ie = 610 - \frac{2344-2355}{2} = 615{,}5 \text{ mm}$$

From table 4 of B section (d=250 mm; 1200 RPM; K=1,82):

$P_b = 11{,}57$ kW

$P_d = 0{,}48$ kW

The arc of contact $\gamma$ of the belt on the smaller pulley is determined by:

$$\gamma = 180° - 57 \cdot \frac{D-d}{l_e} = 180° - 57 \cdot \frac{455-250}{616} \cong 161°$$

From table 2 for $\gamma = 161°$

$C\gamma = 0{,}95$

From table 3, pag 19 for **Oleostatic Gold B 91** belt

$C_L = 1{,}00$

Therefore:

$P_a = (11{,}57+0{,}48) \cdot 0{,}95 \cdot 1{,}00 = 11{,}45$ kW

The number of belts Q necessary for transmission of the power $P_c$ is established by:

$$Q = \frac{P_c}{P_a} = \frac{28{,}6}{11{,}45} = 2{,}5$$

Round up to 3 belts **Oleostatic Gold B 91**.

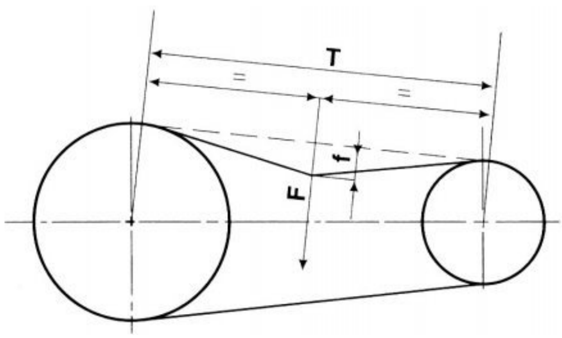


## BELT TENSIONING RECOMMENDATION

The correct belt assembling tension is given by:

$$Ts = 500 \cdot \frac{2{,}5-C_\alpha}{C_\alpha} \cdot \frac{P_C}{Q \cdot v} + m \cdot v^2$$

| Symbol | Unit | Definition |
|---|---|---|
| $C_\alpha$ | | arc correction factor |
| m | kg/m | belt linear mass (see belt family page) |
| $P_c$ | kW | corrected power |
| Q | | number of belts |
| $T_s$ | N/strand | static belt tension |
| v | m/s | peripheral belt speed |
| α | ° | arc of contact |




Arc corretcion factor:

| α [°] | 180 | 174 | 169 | 163 | 157 | 151 | 145 | 139 | 133 | 127 | 120 | 113 | 106 | 99 | 91 | 83 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cα | 1,00 | 0,98 | 0,97 | 0,96 | 0,94 | 0,93 | 0,91 | 0,89 | 0,87 | 0,85 | 0,82 | 0,80 | 0,77 | 0,73 | 0,70 | 0,65 |

# LENGTH MEASURING AND GROOVE PULLEYS

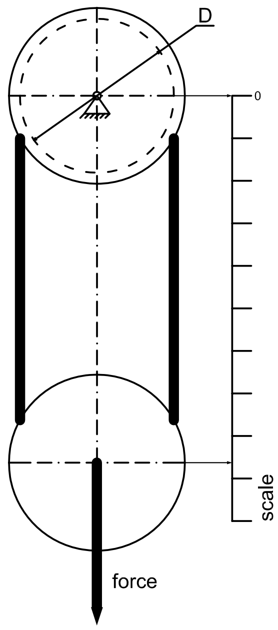
## BELT LENGTH MEASURING

The first and easiest way for measuring the V-belt length is by placing the belt on a flat surface, giving the belt a circular shape and finally measuring the internal length $L_i$ by means of a measuring tape. Adding $\Delta_i$ and after $\Delta_e$ (see belt families pages) to this length, it's possible to calculate respectively $L_p$ and $L_e$.
This measuring way is not very precise, even if practically easy and feasible with a tape only.

The correct way for measuring the V-belt length is by means of pulleys and dynamometer.
The belt is put on 2 pulleys, specific for the family and size of the belt and having the same pitch diameter. One is fixed while the second can move on a linear graduated scale.
Depending on the belt, a certain force is applied to the second pulley in order to put the complete system under tension. The correct force is tabled the relevant standards referring to the belt family.
To stabilize the system, at least 3 rotations of the pulleys are required.
The pitch length $L_p$ is given by the pulleys pitch diameter D and center distance a in the formula:

$L_p = 2 a * \pi_D$

Subtracting $\Delta_i$ and adding $\Delta_e$ (see belt families pages) it's possible to calculate respectively $L_i$ and $L_e$.

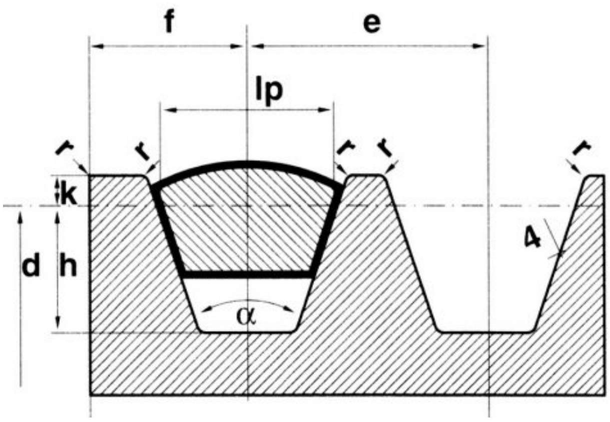





## GROOVE PULLEYS

Groove pulleys for V-belts must be manufactured with care and be made of good quality steel or engineering cast iron. It is most important that the flanks of the grooves shall be perfectly smooth and show no visible sign of machining, that all sharp corners of the grooves shall be rounded off and chamfered and that the external diameter of the face shall be constant overall.
All pulleys must also be statically balanced.
Dynamic balancing is required for speeds over 30 m/second.

Profile and dimension of pulley should be in accordance to DIN 2211, BS 3790, ISO, RMA depending on the belt relevant standard.
In tha drawing are shown the main characteristics and dimensions of groove pulleys for V-belts (example referring to Oleostatic belts).



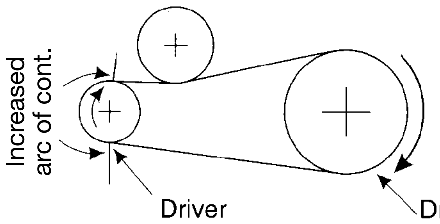

**lp** = pitch width
**k** = minimum height of groove above the pitch line
**h** = minimum depth of groove below the pitch line
**α** = groove angle
**d** = pitch diameter
**e** = distance between the axes of the sections of two grooves
**f** = distance between the axis of the section of the outer groove and the rim of the pulley

The use of idlers in V-belt drives is not recommended.
However, due to particular drive requirements and limitations, use of idlers may be absolutely necessary.
For using idlers, requirements are as follows:
1. Providing take-up for fixed center drives.
2. Turning corners (as in mule pulley drives).
3. Breaking up long spans where belt whip may be a problem.
4. Maintaining tension, when idler is spring-loaded or weighted.
A power corretcion (see below) is required.

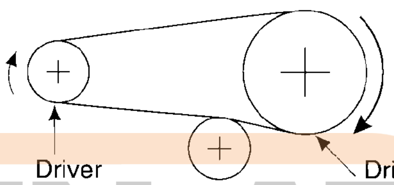
## OUTSIDE IDLER

1. An outside idler should be at least one and one-third times as large as the smallest pulley on the drive, unless drive has unusually large pulleys.
2. An outside idler must be flat and without any crown.
3. To find the face width of a flat idler (between flanges if flanged) add 1 ½ times the nominal belt top width to the face width of the grooved pulley used.
4. An outside idler pulley should be located as close as possible to the preceding pulley. This is because V-belts move back and forth slightly on a flat pulley and locating it as far away from the next pulley minimizes the possibility of the belt entering that pulley in a misaligned condition.
5. Idler pulleys should be located only on the slack side of a drive.

RECOMMENDED




NOT RECOMMENDED

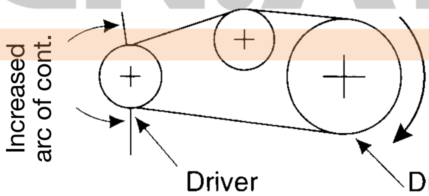




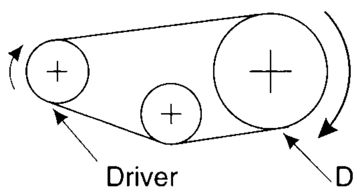

## INSIDE IDLER

1. An inside idler will decrease the arc of contact.
2. An inside idler should be at least as large as the smallest pulley on the drive, unless the drive has unusually large pulleys.
3. An inside idler should better be a grooved pulley. In alternative, flat pulleys can be used.
4. A grooved inside idler pulley may be located anywhere along the span, preferably so that it gives nearly equal arcs of contact on the two adjacent pulleys.
5. Idler pulleys should be located only on the slack side of a drive.

RECOMMENDED




NOT RECOMMENDED




## RATED POWER CORRECTION

Because idlers impose an additional bending stress point on the V-belt, the transmittable power is reduced.
The smaller the idler diameter, the greater the bending stress, which results in a greater reduction in rated power and belt life.
To compensate this loss, the design power of the drive must be increased.
The following table gives the approximate correction factors according to the number of pulleys in the drive.
The normal power rating should be multiplied by this factor.

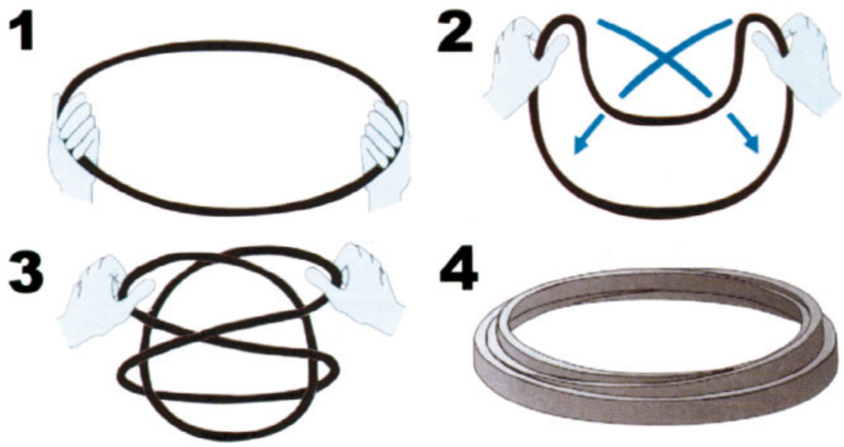
| | | | |
|---|---|---|---|
| **No. of pulleys in drive** | 2 | 3 (one idler) | 4 (two idlers) |
| **Rating Correction Factor** | 1,00 | 0,90 | 0,80 |

**Note:**
As stated, the above listed factors are only approximate values and apply only when idler diameters and their location is in accordance with the above recommendations.

# STORAGE MAINTENANCE AND USEFUL ADVICES

## HOW TO STORE BELTS

In order to store V-Belts correctly, it is advisable to hang them on "saddles" or on large-diameter tubular brackets. This diameter should be at least ten times the height of belts cross section.
Long belts can be stacked to save space, provided that they are correctly coiled (see figures).
Short belts can be stored on shelves, but be aware that stacks should not be more than 300 mm high, as the bottom belts may be otherwise deformed.
Finally, hooks and nails are unsuitable for suspending the belts.






## CONDITIONS OF STORAGE

Rubber V-belts can be stored for several years without causing any performance or reliability loss.
For a correct storage, some prescription have to be taken into account.

- Environment

The storage premises should be cool, dry and well ventilated but not draughty.

- Temperature

Storage temperature should be within +5 and +30°C.
Lower temperatures causes stiffening in the belt but are accepted in the storage. In order to avoid damages in the start-up, it becomes necessary to heat the belt up to around 20° before making it run on the machine.
Higher temperatures due to heating are to be avoided. Distance from heating sources should be at least 1 meter.

- Light

Belts should be protected from light, especially direct sunlight and artificial light with high ultraviolet rays (neon light).

- Ozone

Equipments generating ozone, like high voltage electrical machines or fluorescent light sources, should not be installed in the storage.
Also combustion gases and vapours, that can cause ozone, should be avoided.

- Chemicals

Flammable materials, lubricants, acids and any other aggressive material should not be kept in the storage. Belts elastomers may be affected or even irreparably damaged by such agents.

## CLEANING

Never clean V-belts. If you need, for any reason, to clean belts use a dry towel or one soaked with a glycerine/alcohol mixture in the ratio 1:10. Other solvents such as petrol or benzene must not be used.
Sharp-edged objects must not be used for cleaning V-belts.

To ensure a long service life and high performances, it is important to design correctly the application and to take care of correct installation, maintenance and storage of the belt.
A drive must be designed in such a way to make proper provision for both installation and tensioning of the V-belts. For this purpose a take-up device is necessary; a slide adjuster on the motor is recommended to simplify installation and permit optimum tensioning.
Table 5 (see belt family pages) provides minimum variation of center distance permitted for installation and tensioning of the belts.

x = Take up allowance
y = Installation allowance
I = Center distance

Furthermore, the following rules must always be observed:

**1)** check the alignment of the drive pulleys;
**2)** make sure that the flanks of the grooves are clean;
**3)** adjust the tensioner to stretch the belts sufficiently;
**4)** check the tension (see following section);
**5)** check correct diameter for tensioning pulley;
**6)** protect belt from oil and other chemicals;
**7)** when installing belts, slack off tensioner and avoid using tools or implements which may damage the belts.

Pulleys with large diameters increase belt life. They must be statically balanced up to the speed of 30 m/s and dynamically balanced over this value.



## TENSIONING SYSTEM

The satisfactory performance of a transmission equipped with V-belts depends on the correct fitting tension.
It is therefore necessary to proceed in the following way, using the slide adjuster:

### Belt tension control by deflection method

The approximate relation among deflection force, belt deflection and belt tension is given by:

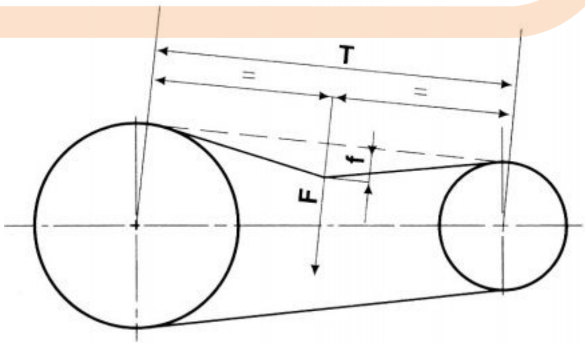
$$T_s \simeq \frac{f \cdot t}{4 \cdot f}$$

Imposing a belt deflection

$$f = \frac{t}{64}$$

the deflection force should be in the range

$$F_{min} \simeq F' = \frac{T_s}{16} \qquad F_{max} \simeq F'' = \frac{1{,}5 \cdot T_s}{16}$$




where:

| *Symbol* | *Unit* | *Definition* |
|---|---|---|
| **F** | N | perpendicular deflection force |
| **f** | mm | belt deflection |
| **t** | mm | free span length |
| **$T_s$** | N/strand | static belt tension (see page 9) |

Belt tension control by vibration method

Belt vibration frequency: $F^2_r = \frac{T_s}{4 \cdot m \cdot t^2}$

| *Symbol* | *Unit* | *Definition* |
|---|---|---|
| **$F_r$** | Hz | natural frequency of belt |
| **m** | kg/m | specific belt mass |
| **t** | m | free span length |
| **$T_s$** | N/strand | static belt tension (see page 9) |


MEGADYNE
VARISECT ®
28 X 8

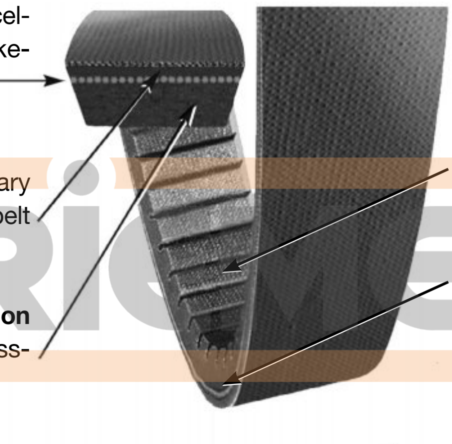
## BELT CHARACTERISTICS

| section | 13x6 | 17x6 | 21x7 | 22x8 | 26x8 | 28x8 | 30x10 | 32x10 | 36x12 | 37x10 | 42x13 | 47x13 | 52x16 | 55x16 | 65x20 | 70x20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| w (mm) | 13 | 17 | 21 | 22 | 26 | 28 | 30 | 32 | 36 | 37 | 42 | 47 | 52 | 55 | 65 | 70 |
| T (mm) | 6 | 6 | 7 | 8 | 8 | 8 | 10 | 10 | 12 | 10 | 13 | 13 | 16 | 16 | 20 | 20 |
| pitch length - internal length = Δi (mm) | 29 | 29 | 33 | 38 | 38 | 38 | 47 | 47 | 56 | 47 | 61 | 61 | 75 | 75 | 94 | 94 |
| external length - pitch length = Δe (mm) | 9 | 9 | 11 | 12 | 12 | 12 | 16 | 16 | 19 | 16 | 21 | 21 | 25 | 25 | 31 | 31 |
| ISO | | W16 | W20 | | W25 | | | W31,5 | | | W40 | | W50 | | W63 | |
| β (°) | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| working temperature | -30°C / +90°C | | | | | | | | | | | | | | | |
| relevant standards | ISO 1604 (for W... type only) | | | | | | | | | | | | | | | |
| relevant antistatic standard | ISO 1813 | | | | | | | | | | | | | | | |
| materials | CR blend - polyester cord | | | | | | | | | | | | | | | |

**High-modulus cords**
Located in the strength section to carry high HP loads with minimum belt stretch. Resists fatigue and shock. Provides excellent belt stability. Reduces need for take-up adjustments.

**Fabric tension section**
Stretches up to 175% more than ordinary bias-cut fabric to significantly improve belt flex life.

**Special compound compression section**
Provides uniform cord support and cross-wise rigidity to lengthen belt life.



**Precision molded cogs**
Provide more surface area for heat dissipation and increase belt flexibility. Cooler operation means longer flex life.

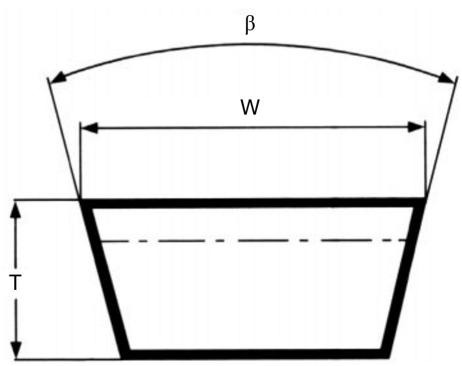
**Raw-edge sidewalls**
Improve gripping contact with pulley sidewalls. Assure less vibration. Smoother, quieter performance.



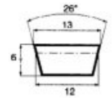
## FEATURES

Varisect belts are designed for variable speed transmissions, to obtain a wide range of driven speeds:

- provides exact speed control;
- guarantees smooth running;
- raw edge sidewalls improve gripping action;
- provide superior resistance to aging caused by wear, oil, heat, grease and harmful environmental factors;
- static dissipating;
- is available in a wide selection of sizes;
- guarantees a long belt life.

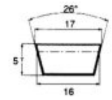


# VARIABLE SPEED V-BELTS
## Varisect



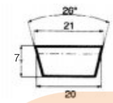

## 13X6 SECTION

| Code | Internal length LI (mm) | Code | Internal length LI (mm)) | Code | Internal length LI (mm)) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13x6x425 | 425 | 13x6x525 | 525 | 13x6x650 | 650 | 13x6x700 | 700 | 13x6x750 | 750 | 13x6x900 | 900 |
| 13x6x500 | 500 | 13x6x550 | 550 | 13x6x675 | 675 | 13x6x725 | 725 | 13x6x775 | 775 | | |




## 17X6 W16 SECTION

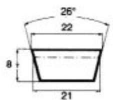
| Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) |
|---|---|---|---|---|---|---|---|---|---|
| 16 W 450 | 450 | 16 W 560 | 560 | 16 W 630 | 630 | 16 W 800 | 800 | 16 W 1000 | 1000 |
| 16 W 500 | 500 | 16 W 600 | 600 | 16 W 710 | 710 | 16 W 900 | 900 | | |




## 21X7 W20 SECTION

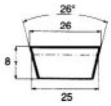
| Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) |
|---|---|---|---|---|---|---|---|---|---|
| 20 W 560 | 560 | 20 W 640 | 640 | 20 W 800 | 800 | 20 W 1000 | 1000 | 20 W 1250 | 1250 |
| 20 W 630 | 630 | 20 W 710 | 710 | 20 W 900 | 900 | 20 W 1120 | 1120 | | |





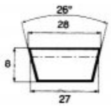

## 22X8 SECTION

| Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22X8 X500 | 500 | 22X8 X600 | 600 | 22X8 X675 | 675 | 22X8 X800 | 800 | 22X8 X1000 | 1000 | 22X8 X1250 | 1250 | 22X8 X1600 | 1600 |
| 22X8 X525 | 525 | 22X8 X610 | 610 | 22X8 X700 | 700 | 22X8 X850 | 850 | 22X8 X1060 | 1060 | 22X8 X1320 | 1320 | 22X8 X2000 | 2000 |
| 22X8 X550 | 550 | 22X8 X625 | 625 | 22X8 X725 | 725 | 22X8 X900 | 900 | 22X8 X1120 | 1120 | 22X8 X1400 | 1400 | | |
| 22X8 X575 | 575 | 22X8 X650 | 650 | 22X8 X750 | 750 | 22X8 X950 | 950 | 22X8 X1180 | 1180 | 22X8 X1500 | 1500 | | |



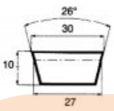

## 26X8 W25 SECTION

| Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 W 560 | 560 | 25 W 710 | 710 | 25 W 790 | 790 | 25 W 900 | 900 | 25 W 1120 | 1120 | 25 W 1400 | 1400 |
| 25 W 690 | 690 | 25 W 750 | 750 | 25 W 800 | 800 | 25 W 1000 | 1000 | 25 W 1250 | 1250 | 25 W 1600 | 1613 |



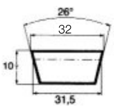

## 28X8 SECTION

| Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 28X8 X525 | 525 | 28X8 X650 | 650 | 28X8 X800 | 800 | 28X8 X950 | 950 | 28X8 X1120 | 1120 | 28X8 X1320 | 1320 | 28X8 X1600 | 1600 |
| 28X8 X600 | 600 | 28X8 X700 | 700 | 28X8 X850 | 850 | 28X8 X1000 | 1000 | 28X8 X1180 | 1180 | 28X8 X1400 | 1400 | 28X8 X1700 | 1700 |
| 28X8 X625 | 625 | 28X8 X750 | 750 | 28X8 X900 | 900 | 28X8 X1060 | 1060 | 28X8 X1250 | 1250 | 28X8 X1500 | 1500 | | |




## 30X10 SECTION

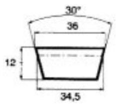
| Code | Internal length LI (mm) | Code | Internal length LI (mm)) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30X10X650 | 650 | 30X10X800 | 800 | 30X10X900 | 900 | 30X10X1035 | 1035 | 30X10X1200 | 1200 | 30X10X1500 | 1500 |
| 30X10X665 | 665 | 30X10X850 | 850 | 30X10X950 | 950 | 30X10X1050 | 1050 | 30X10X1320 | 1320 | 30X10X1600 | 1600 |
| 30X10X700 | 700 | 30X10X875 | 875 | 30X10X1000 | 1000 | 30X10X1120 | 1120 | 30X10X1340 | 1340 | | |




## 32X10 W31,5 SECTION

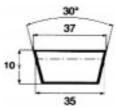
| Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 31,5 W 800 | 800 | 31,5 W 870 | 870 | 31,5 W 950 | 950 | 31,5 W 1050 | 1050 | 31,5 W 1250 | 1250 | 31,5 W 1600 | 1600 | 31,5 W 2000 | 2000 |
| 31,5 W 840 | 840 | 31,5 W 900 | 900 | 31,5 W 1000 | 1000 | 31,5 W 1120 | 1120 | 31,5 W 1400 | 1400 | 31,5 W 1800 | 1800 | | |

# VARIABLE SPEED V-BELTS
## Varisect




### 36X12 SECTION

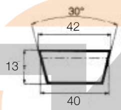
| Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36X12X700 | 700 | 36X12X850 | 850 | 36X12X1000 | 1000 | 36X12X1180 | 1180 | 36X12X1400 | 1400 | 36X12X1700 | 1700 | 6X12X2120 | 2120 |
| 36X12X725 | 725 | 36X12X900 | 900 | 36X12X1060 | 1060 | 36X12X1250 | 1250 | 36X12X1500 | 1500 | 6X12X1800 | 1800 | | |
| 36X12X800 | 800 | 36X12X950 | 950 | 36X12X1120 | 1120 | 6X12X1320 | 1320 | 36X12X1600 | 1600 | 6X12X2000 | 2000 | | |




### 37X10 SECTION

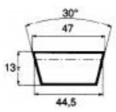
| Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 37X10X600 | 600 | 37X10X800 | 800 | 37X10X1000 | 1000 | 37X10X1250 | 1250 | 37X10X1600 | 1600 | 37X10X2000 | 2000 |
| 37X10X650 | 650 | 37X10X850 | 850 | 37X10X1060 | 1060 | 37X10X1320 | 1320 | 37X10X1700 | 1700 | 37X10X2240 | 2240 |
| 37X10X675 | 675 | 37X10X900 | 900 | 37X10X1120 | 1120 | 37X10X1400 | 1400 | 37X10X1800 | 1800 | | |
| 37X10X750 | 750 | 37X10X950 | 950 | 37X10X1180 | 1180 | 37X10X1500 | 1500 | 37X10X1900 | 1900 | | |





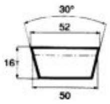

### 42X13 W40 SECTION

| Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) |
|---|---|---|---|---|---|---|---|
| 40 W 1060 | 1060 | 40 W 1180 | 1180 | 40 W 1600 | 1600 | 40 W 2000 | 2000 |
| 40 W 1100 | 1100 | 40 W 1250 | 1250 | 40 W 1660 | 1660 | 40 W 2240 | 2240 |
| 40 W 1120 | 1120 | 40 W 1400 | 1400 | 40 W 1800 | 1820 | 40 W 2500 | 2500 |



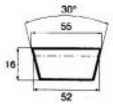

### 47X13 SECTION

| Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 47X13X900 | 900 | 47X13X1060 | 1060 | 47X13X1250 | 1250 | 47X13X1500 | 1500 | 47X13X1800 | 1800 | 47X13X2240 | 2240 |
| 47X13X950 | 950 | 47X13X1120 | 1120 | 47X13X1320 | 1320 | 47X13X1600 | 1600 | 47X13X1900 | 1900 | | |
| 47X13X1000 | 1000 | 47X13X1180 | 1180 | 47X13X1400 | 1400 | 47X13X1700 | 1700 | 47X13X2000 | 2000 | | |




## 52X16 W50 SECTION

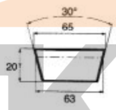
| Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) |
|---|---|---|---|---|---|---|---|---|---|
| 50 W 1250 | 1250 | 50 W 1600 | 1600 | 50 W 2000 | 2000 | 50 W 2500 | 2500 | 50 W 3150 | 3150 |
| 50 W 1400 | 1400 | 50 W 1800 | 1800 | 50 W 2240 | 2240 | 50 W 2800 | 2800 | | |




## 55X16 SECTION

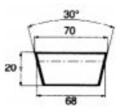
| Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) |
|---|---|---|---|---|---|---|---|
| 55X16X1180 | 1180 | 55X16X1400 | 1400 | 55X16X1700 | 1700 | 55X16X2000 | 2000 |
| 55X16X1250 | 1250 | 55X16X1600 | 1600 | 55X16X1800 | 1800 | 55X16X2240 | 2240 |






## 65X20 W63 SECTION

| Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) | Code | Nominal Pitch length LD (mm) |
|---|---|---|---|---|---|---|---|---|---|
| 63 W 1600 | 1600 | 63 W 2000 | 2000 | 63 W 2500 | 2500 | 63 W 3150 | 3150 | 63 W 4000 | 4000 |
| 63 W 1800 | 1800 | 63 W 2240 | 2240 | 63 W 2800 | 2800 | 63 W 3550 | 3550 | | |




## 70X20 SECTION

| Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) | Code | Internal length LI (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 70X20X1320 | 1320 | 70X20X1445 | 1445 | 70X20X1600 | 1600 | 70X20X1800 | 1800 | 70X20X2000 | 2000 | 70X20X2240 | 2240 | 70X20X2500 | 2500 |
| 70X20X1400 | 1400 | 70X20X1500 | 1500 | 70X20X1700 | 1700 | 70X20X1900 | 1900 | 70X20X2120 | 2120 | 70X20X2360 | 2360 | 70X20X2800 | 2800 |

# DATA SHEET FOR CALCULATION

## CUSTOMER DATA

Date ____/_____/_____

Company Name ____________________________________________
Address ______________________________ Zip Code ____________
City ___________________ State __________ Country _____________
Customer Name/Surname ______________________________________
Office_________________ Tel. ____________ Fax ________________
e-mail ________________________________________________

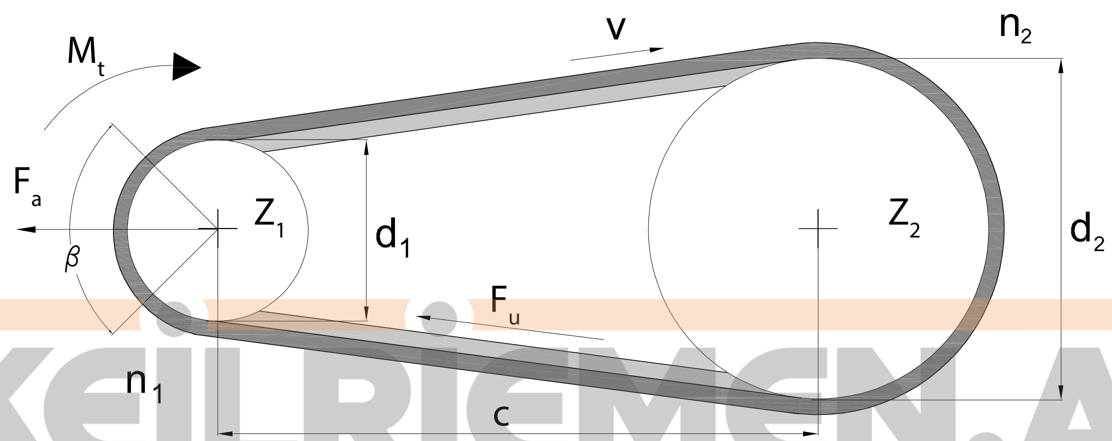
Application field ______________________________ New   Existing*

Volume: ______________________________

*Please enclose to this request all the details of the existing application (competitor's belt, current data, etc..)

## POWER TRANSMISSION

### TRANSMISSION LAYOUT




**If layout is different please sketch it below**

## DRIVE INFORMATION

### MOTOR:

☐ AC ☐ DC ☐ Soft Start ☐ Inverter

Power: ______________________

Speed: ______________________

Torque: ______________________

Acceleration: __________________

Working time: ☐ < 8h ☐ From 8h up to 16h ☐ >16h

### APPLICATION:

Driver pulley diameter: ________________

Driven pulley diameter: ________________

Center distance: ______________________

Minimum safety factor required: __________

Are there any size limitation? ☐ Yes ☐ No

(if yes please indicate):

diameter (min. and/or max.): ____________

width (min. and/or max.): ______________

center distance: (min. and/or max.) _________

# NOTES